

Repurposing Plastics Waste in Infrastructure

Committee

David A. Dzombak

Chair

David Dzombak is the Hamerschlag University Professor and Head of the Department of Civil and Environmental Engineering at Carnegie Mellon University. The emphasis of his research and teaching is on water quality engineering, water resource sustainability, and energy-environment issues. At Carnegie Mellon he also has served as Associate Dean for Graduate and Faculty Affairs for the College of Engineering (2006-2010) and as Director of the Steinbrenner Institute for Environmental Education and Research (2007-2013). Dzombak received his Ph.D. in Civil Engineering from the Massachusetts Institute of Technology in 1986. He also holds an M.S. in Civil Engineering (1981) and a B.S. in Civil Engineering (1980) from Carnegie Mellon, and a B.A. in Mathematics from Saint Vincent College (1980). He is a registered Professional Engineer in Pennsylvania, a Board Certified Environmental Engineer, a Diplomate Water Resources Engineer, a Distinguished Member of the American Society of Civil Engineers, and a member of the National Academy of Engineering. Among various professional service contributions, he was a member and co-chair of the National Academies Roundtable on Science and Technology for Sustainability (2013-2021).

Janie M. Chermak

Member

Janie Chermak is a Professor of Economics and chair of the Department of Economics at the University of New Mexico. She is also affiliated faculty in the Sustainability Studies Program at the University of New Mexico and in the Global Energy Management Program at the University of Colorado – Denver. She is an applied microeconomist, specializing in resource economics. Her research focuses on applying dynamic optimization to interdisciplinary resource problems, including the optimal production of natural gas wells, the economics of water, produced water, and invasive species, as well as the economics of reduced carbon technologies, and place-based choices. She completed her MSc and PhD in mineral economics at the Colorado School of Mines and her BA in geology at Western State College. She was previously a committee member on the NAS study of “Selling the National Helium Reserve.”

David D. Cornell

Member

David Cornell is a nationally recognized expert in plastics manufacturing, mechanical and chemical recycling, testing protocols to evaluate the recyclability of plastics, and market demand for recycled plastics. He is a consultant serving as Director of Engineering and Recycling for SBA-CCI, which provides consulting services to the petrochemical, consumer products, and packaging industries on issues affecting the supply of and demand for polyethylene terephthalate (PET) resins, which are used for packaging foods, beverages, pharmaceuticals, and other applications. At SBA-CCI, he conducts life cycle assessments and studies of processes and equipment for recycling plastics, mass balances, quality plans and sources of plastics feedstock, and packaging innovations to ensure that packaging is amenable to recycling. He is also a technical consultant to the Association of Plastic Recyclers (APR), which is an international trade association representing the plastics recycling industry. APR's members seek to increase end market demand for recycled resins and ensure that consumer products using plastics are designed for eventual recycling. In consulting for APR, he conducts life cycle studies of plastics that spans their manufacturing, recycling, and commercial uses, including end markets for recycled plastics. He was previously Manager of Plastics Recycling and Technology for Eastman Chemical Company, then the world's largest supplier of PET packaging resins. He has been a life cycle assessment peer reviewer for U.S. Environmental Protection Agency's grant requests. He is a member of the International Plastics Hall of Fame. Mr. Cornell holds a M.S. in Materials Science from the University of Cincinnati, and a B.S. in Chemical Engineering and B.A. in Mathematics from the University of Delaware. Mr. Cornell is a registered Professional Engineer in the state of Tennessee.

Jennifer L. Harper

Member

Jennifer Harper is Research Director of the Missouri Department of Transportation (MODOT). At MODOT she has worked in the Bridge Design Division, Organizational Results Division, and currently works in the Construction and Materials Division. As the research director, she works with MoDOT's Senior Management Team to identify research opportunities that can help the Department provide services more efficiently and effectively. One of the current key projects involves a collaboration with the University of Missouri and Dow Inc. to test the use of plastics waste in road pavement mixtures. Ms. Harper is also the MoDOT coordinator for the Federal Highway Every Day Counts program. Prior to MoDOT, Ms. Harper worked for an engineering consulting firm in Kansas City, Missouri designing office buildings, schools, and parking garages. She holds bachelor degrees in Civil Engineering (University of Missouri-Columbia) and Mathematics (Central Methodist University). She is a licensed Professional Engineer and a certified Project Manager.

Thomas J. Kazmierowski

Member

Thomas Kazmierowski is a Senior Consultant with Golder Associates Ltd. specializing in Pavement and Materials Engineering. Prior to December 31, 2012, he held the position of Manager of the Office responsible for Materials Engineering and Research (MERO) within the Ministry of Transportation of Ontario where he was employed for 37 years. Mr. Kazmierowski is an internationally recognized contributor in the fields of both rigid and flexible pavement design, rehabilitation, and management. He has over 40 years of experience in pavement/material investigation, evaluation, design, construction, maintenance, and rehabilitation. Mr. Kazmierowski was awarded the title of "National Associate" by the US National Academies of Science, Engineering and Medicine in 2016. He received the Transportation Association of Canada's Distinguished Service Award in September 2010 as well as the Charles R. Valentine Award for Excellence in Cold Recycling by the Asphalt Recycling and Reclaiming Association (ARRA) in February 2008 and the Canadian Summit Award for Leadership in Green Procurement, October 2007. Currently he Co-chairs the Transportation Research Record Advisory Board and Past Chair of TRB's Design and Construction Group, Chair of the Construction Section, Chair of the Pavement Management Section plus current / past member of various TRB committees, FHWA / AASHTO / NCHRP working groups / task forces. Mr. Kazmierowski holds an Honors Bachelor of Applied Science degree in Civil/Geological Engineering from the University of Toronto.

Emmanuel Liban

Member

Cris B. Liban, P.E., serves as Chief Sustainability Officer at the Los Angeles County Metropolitan Transportation Authority (LA Metro). Dr. Liban has worked at LA Metro since 2003 and has grown his agency's environmental and sustainability practice into the most progressive and forward-looking in the country, implementing over 150 sustainability initiatives to date. He is working to ensure that \$140B in capital projects that are programmed for the next 40 years are sustainable, climate-adapted, and resilient for the more than 10 million people of Los Angeles County. Many of these are to be completed in time for the 2028 Olympics. He is currently the Transportation Chapter Lead of the forthcoming Fifth National Climate Assessment. He held previous political appointments in the EPA's National Advisory Council for Environmental Policy and Technology and the California Climate Safe Infrastructure Working Group.

In 2016 he received the Philippines' highest civilian honor for Filipinos living overseas, the Pamana ng Pilipino Award, from Philippines President Rodrigo Duterte. A year later, Dr. Liban was awarded the Engineering-News Record's (ENR) 2020 Award of Excellence and in 2021 was elected to the National Academy of Construction. Dr. Liban has degrees in geology, civil engineering, and environmental science and engineering.

Eric C. Macfarlane

Member

Eric Macfarlane leads the New York City Department of Design and Construction, Infrastructure Division, with a technical staff of 500 engineers, project managers, and analysts. His division is responsible for the design and construction management of the capital infrastructure programs for the city: the storm drainage system, consolidated roadways, sanitary sewers, the water distribution network, and various urban landscape improvements. Currently the division has a five-year capital portfolio of 625 projects in various phases valued at more than \$10 billion, a record. Among his successes, Mr. Macfarlane led the East Side Coastal Resiliency Project — which will protect 110,000 New York citizens with reduced flood risk as well as enhanced waterfront and urban spaces, the reconstruction of iconic Times Square, and the Plaza de las Americas. Mr. Macfarlane holds M.S. and B.S. degrees in Civil Engineering and is a licensed Professional Engineer in New York State. Mr. Macfarlane is a member of the National Academy of Construction.

Debra R. Reinhart

Member

Debra Reinhart is a Pegasus Professor Emerita at the University of Central Florida. Prior to her retirement in June 2021, she was Associate Vice President for Research and Scholarship at the University of Central Florida and a member of the Civil, Environmental and Construction Engineering Department. Dr. Reinhart's research area is solid waste management, with a focus on optimized waste collection, recycling, and processing as well as sustainable operation of landfills. From 2011-2013, Dr. Reinhart was a program manager at the National Science Foundation. Dr. Reinhart is an Associate Editor for the Waste Management. She is a registered professional engineer in Florida and Georgia, a Board Certified Environmental Engineer, and a Fellow of the American Society of Civil Engineers, the American Association for the Advancement of Science, and the Association of Environmental Engineering and Science Professors. She holds a B.S. in Engineering from Florida Technological University, and an M.S. in Sanitary Engineering and a Ph.D. in Environmental Engineering from Georgia Institute of Technology.

Joseph S. Robinson

Member

Joseph Robinson is the Chief Materials Engineer for the Pennsylvania Department of Transportation (PennDOT). Prior to his current position, Mr. Robinson spent 24 years in the PennDOT Construction Quality Assurance Section, serving as Section Chief for the last 12 years. Mr. Robinson has been instrumental in PennDOT's piloting of plastics in asphalt pavements, working closely with the Pavement Materials Engineer. Mr. Robinson holds a B.S. degree in Structural Design and Construction Engineering from Pennsylvania State University – Harrisburg.

Delmar R. Salomon

Member

Delmar Salomon is the President and Founder of Pavement Preservation Systems LLC (2005), an Idaho Consulting group dedicated to technology transfer, modified asphalt, pavement management and technical marketing in the asphalt field, as well as the promotion of processes that contribute to improving asphalt materials for long-lasting pavements. His consulting practice offers implementation and optimization of pavement preservation strategies; development and optimization of asphalt emulsion production; innovative spectroscopic methods for in-situ testing of pavement materials; pavement design solutions for flexible, rigid, and composite pavements; asphalt product formulations; and pavement forensics. Dr. Salomon has three Consensus Standards approved at ASTM International (D7404; D7226; D7229) for emulsified asphalt, and two AASHTO standards: TP 128, "Method of Test for Evaluation of Oxidation Level of Asphalt Mixtures by a Portable Infrared Spectrometer" and AASHTO T 382, "Method of Test for Determining the Viscosity of Emulsified Asphalt by a Rotational Paddle Viscometer". He is Member of the Canadian Technical Asphalt Association, past Chair of the Transportation Research Board Standing Committee on "Characteristics of Asphalt Materials", former Board member of the Mexican Asphalt Association, and former Board member of the Association of Modified Asphalt Producers. Dr. Salomon holds a Ph.D. in Chemistry from the Worcester Polytechnic Institute.

Shoshanna Saxe

Member

Shoshanna Saxe is an assistant professor in Civil and Mineral Engineering at The University of Toronto, and a Canada Research Chair in Sustainable Infrastructure. Dr. Saxe researches the intersections between the infrastructure we build and the world we create with a specific focus on long-term environmental sustainability. Her research includes environmental life cycle assessment of infrastructure, material flow analysis of the built environment and transportation sustainability. Saxe is a former Action Canada fellow, sits on Waterfront Toronto's Capital Peer Review Panel, is a senior fellow at Massey College and sits the board of the International Society for Industrial Ecology. She was awarded the 2019 OPEA Engineering Medal - Young Engineer and the 2021 ULI WLI Championship Team.

Randy C. West

Member

Randy West is the Director at the National Center for Asphalt Technology (NCAT) and a Research Professor at Auburn University. Dr. West has worked in the asphalt pavement industry for 32 years, beginning his career as a bituminous research engineer with the Florida Department of Transportation from 1988 to 1995. He was the Director of Materials Services for APAC Inc. from 1995 to 2003. His expertise is asphalt pavement materials, construction, and quality assurance. He is a member of ASTM, the International Society for Asphalt Pavements, TRB Committee AKC-60, and the Association of Asphalt Paving Technologists, serving as its President in 2016. He is currently the Director of the Consortium for Asphalt Pavement Research & Implementation. He received his Ph.D. from the University of Florida in 1995 and is a registered professional engineer in Alabama, Florida, and Georgia.

Karen L. Wooley

Member

Karen Wooley is the W. T. Doherty-Welch Chair in Chemistry and a University Distinguished Professor at Texas A&M University, where she holds appointments in the Departments of Chemistry, Chemical Engineering and Materials Science & Engineering. She also serves as Director of the Laboratory for Synthetic-Biologic Interactions. Research interests include the synthesis and characterization of degradable polymers derived from natural products, unique macromolecular architectures and complex polymer assemblies, and the design and development of well-defined nanostructured materials. The development of novel synthetic strategies, fundamental study of physicochemical and mechanical properties, and investigation of the functional performance of her materials in the diagnosis and treatment of disease, as non-toxic anti-biofouling or anti-icing coatings for the marine environment, as materials for microelectronics device applications, and as pollutant remediation systems are particular foci of her research activities. Recent awards include the American Chemical Society Award in Polymer Chemistry (2014), Royal Society of Chemistry Centenary Prize (2014), Fellow of the Royal Society of Chemistry (2014), Honorary Fellow of the Chinese Chemical Society (2014), Oesper Award (2015), and Fellow of the American Academy of Arts and Sciences (2015). Karen currently serves as an Associate Editor for the Journal of the American Chemical Society, among many other advisory roles within the broader scientific community.